

Product Summary

| BV_{DS} | $R_{DS(ON)}$ MAX | I_D $T_A = +25^\circ\text{C}$ |
|-----------|---------------------------------------|------------------------------------|
| 40V | 24m Ω @ $V_{GS} = 10\text{V}$ | 7.5A |
| | 32m Ω @ $V_{GS} = 4.5\text{V}$ | 6.5A |

Description

This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

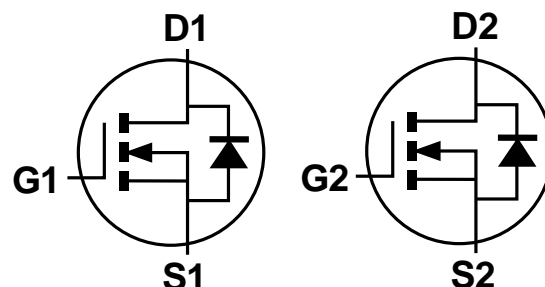
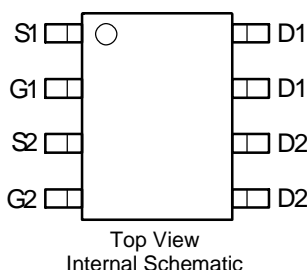
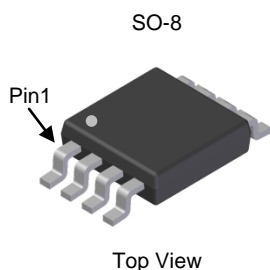
- Motor Control
- Backlighting
- Power Management Functions
- DC-DC Converters

Features

- Rated to $+175^\circ\text{C}$ – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching – Ensures More Reliable and Robust End Application
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMNH4026SSDQ](#))**

Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram Below
- Terminals: Finish — Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208
- Weight: 0.074 grams (Approximate)



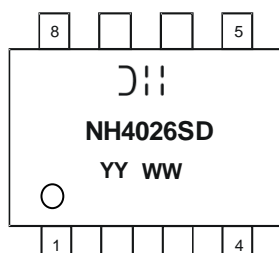
Equivalent Circuit

Ordering Information (Note 4)

| Part Number | Case | Packaging |
|----------------|------|-------------------|
| DMNH4026SSD-13 | SO-8 | 2,500/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



= Manufacturer's Marking
 NH4026SD = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Year (ex: 16 = 2016)
 WW = Week (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Unit |
|---|--------------|---|------------------|------------|------|
| Drain-Source Voltage | | | V _{DSS} | 40 | V |
| Gate-Source Voltage | | | V _{GSS} | ±20 | V |
| Continuous Drain Current (Note 6) V _{GS} = 10V | Steady State | T _A = +25°C T _A = +100°C | I _D | 7.5 5.3 | A |
| Maximum Continuous Body Diode Forward Current (Note 6) | | | I _S | 2.5 | A |
| Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%) | | | I _{DM} | 60 | A |
| Avalanche Current (Note 7) L = 0.1mH | | | I _{AS} | 18 | A |
| Avalanche Energy (Note 7) L = 0.1mH | | | E _{AS} | 18 | mJ |

Thermal Characteristics

| Characteristic | | Symbol | Value | Unit |
|--|------------------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5) | T _A = +25°C | P _D | 1.5 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | R _{θJA} | 101 | °C/W |
| | t < 10s | | 59 | |
| Total Power Dissipation (Note 6) | T _A = +25°C | P _D | 2.0 | W |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | R _{θJA} | 74 | °C/W |
| | t < 10s | | 43 | |
| Thermal Resistance, Junction to Case (Note 6) | | R _{θJC} | 10.5 | |
| Operating and Storage Temperature Range | | T _J , T _{STG} | -55 to +175 | °C |

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|-----|------|------|------|--|
| OFF CHARACTERISTICS (Note 8) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 40 | — | — | V | V _{GS} = 0V, I _D = 250µA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 1 | µA | V _{DS} = 40V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±20V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 8) | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | 1 | — | 3 | V | V _{DS} = V _{GS} , I _D = 250µA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | 15 | 24 | mΩ | V _{GS} = 10V, I _D = 6A |
| | | — | 20 | 32 | | V _{GS} = 4.5V, I _D = 5A |
| Diode Forward Voltage | V _{SD} | — | 0.7 | 1.0 | V | V _{GS} = 0V, I _S = 1.0A |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C _{ISS} | — | 1060 | — | pF | V _{DS} = 20V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{OSS} | — | 84 | — | | |
| Reverse Transfer Capacitance | C _{RSS} | — | 58 | — | | |
| Gate Resistance | R _g | — | 1.6 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz |
| Total Gate Charge (V _{GS} = 4.5V) | Q _g | — | 8.8 | — | nC | V _{DS} = 20V, I _D = 8A |
| Total Gate Charge (V _{GS} = 10V) | Q _g | — | 19.1 | — | | |
| Gate-Source Charge | Q _{gs} | — | 3.0 | — | | |
| Gate-Drain Charge | Q _{gd} | — | 2.5 | — | | |
| Turn-On Delay Time | t _{D(ON)} | — | 5.3 | — | ns | V _{DD} = 25V, R _L = 2.5Ω V _{GS} = 10V, R _g = 3Ω |
| Turn-On Rise Time | t _r | — | 7.1 | — | | |
| Turn-Off Delay Time | t _{D(OFF)} | — | 15.1 | — | | |
| Turn-Off Fall Time | t _f | — | 4.8 | — | | |
| Body Diode Reverse Recovery Time | t _{RR} | — | 10.5 | — | ns | I _F = 8A, di/dt = 100A/µs |
| Body Diode Reverse Recovery Charge | Q _{RR} | — | 4.15 | — | nC | I _F = 8A, di/dt = 100A/µs |

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate
 - I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

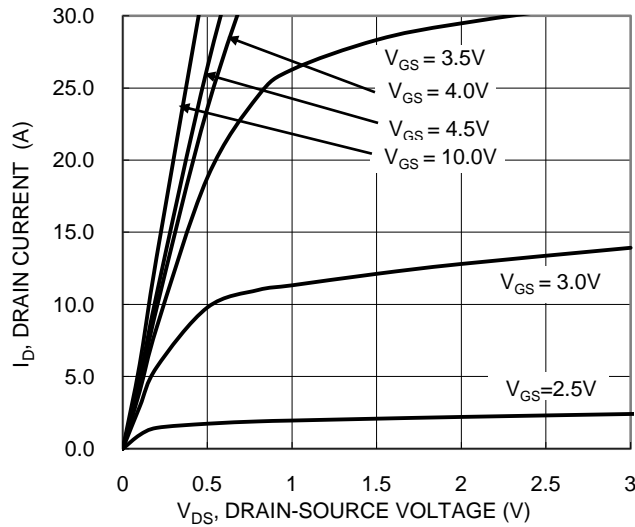


Figure 1. Typical Output Characteristic

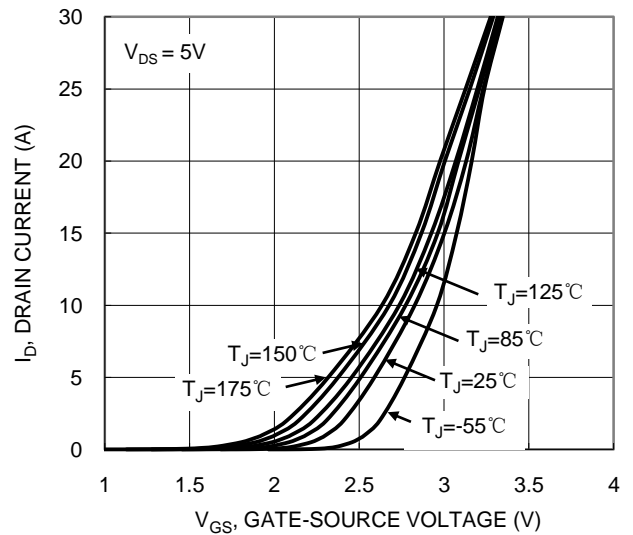


Figure 2. Typical Transfer Characteristic

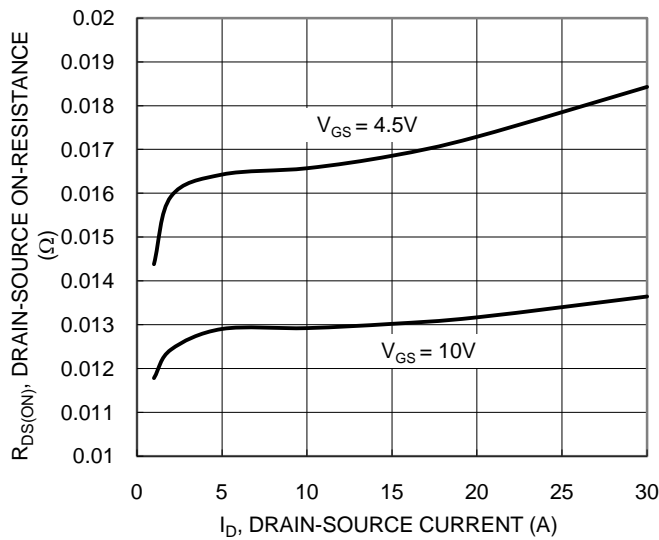


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

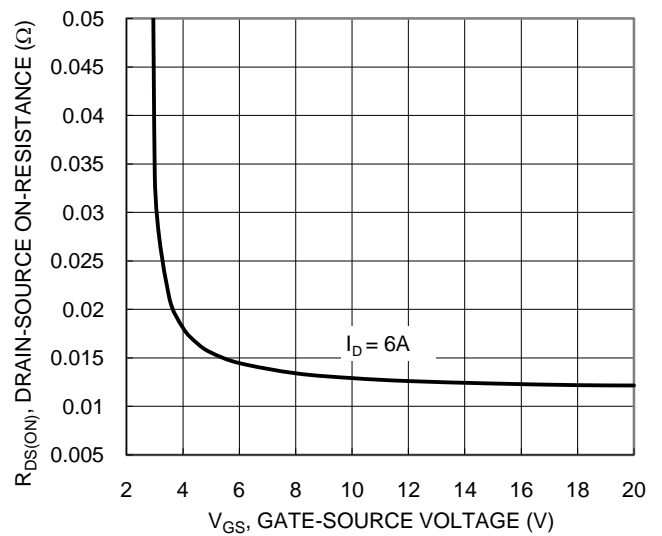


Figure 4. Typical Transfer Characteristic

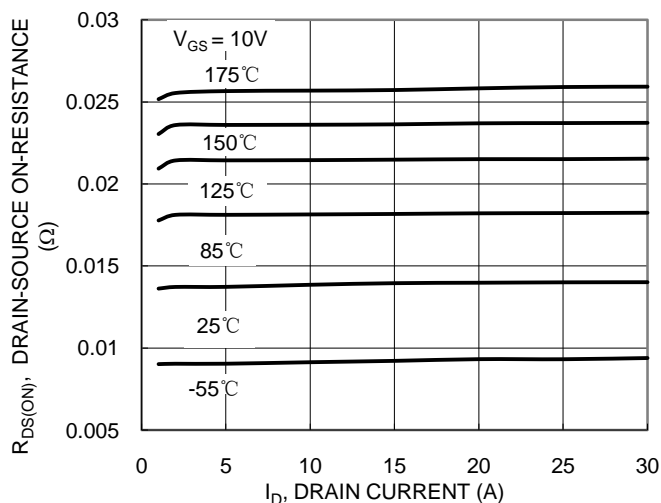


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

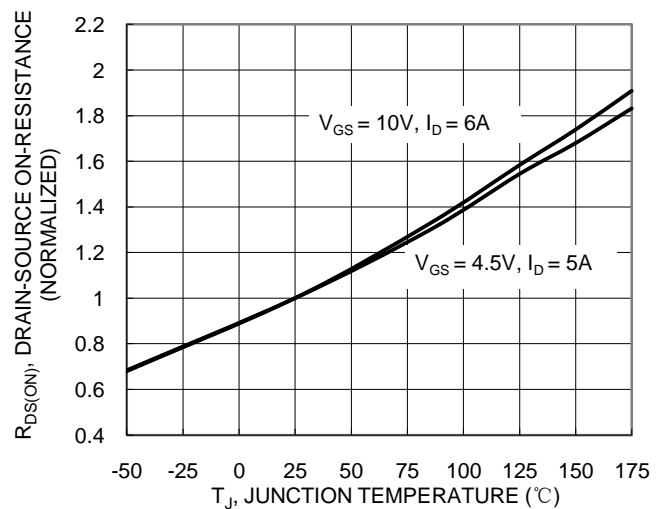
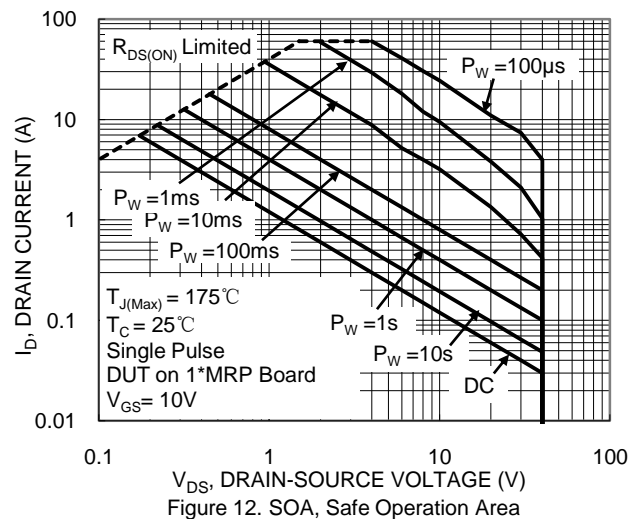
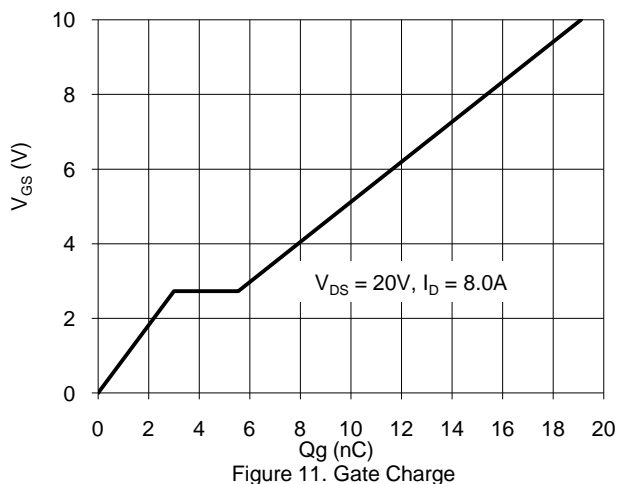
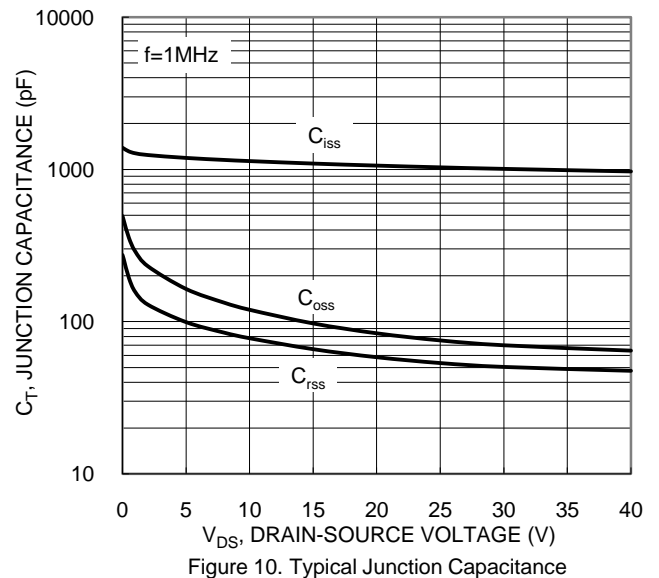
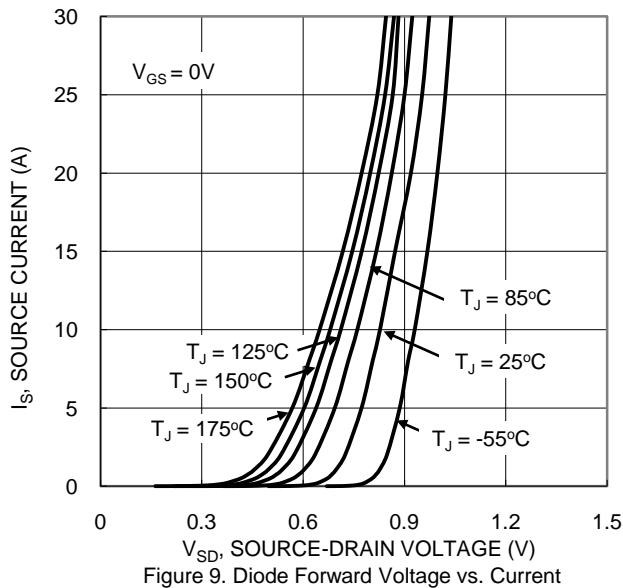
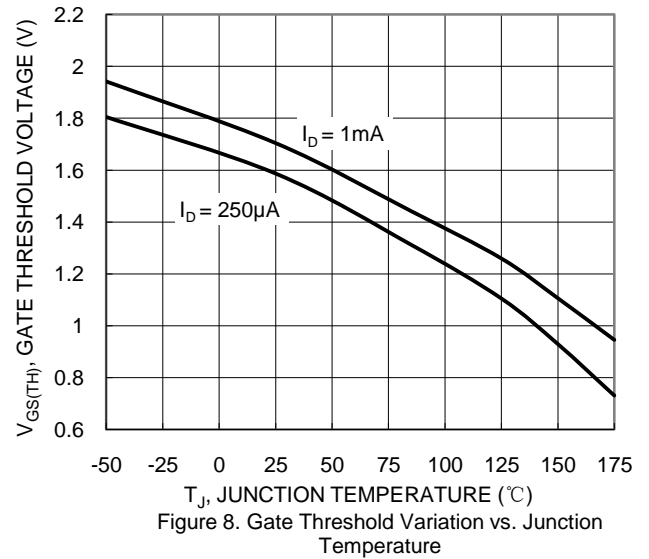
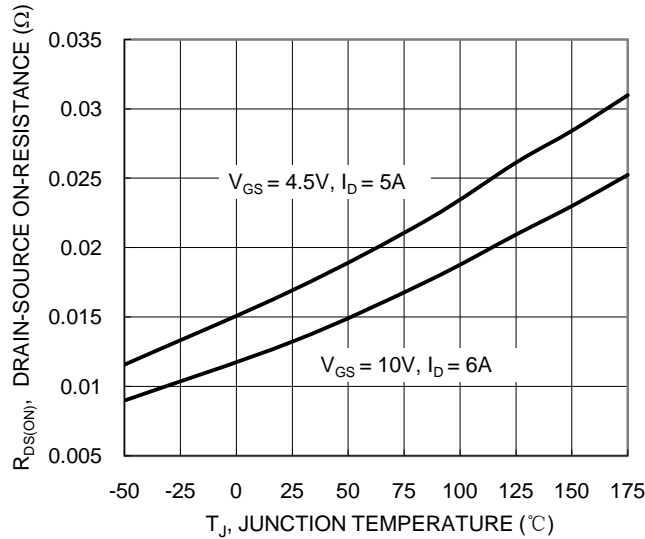


Figure 6. On-Resistance Variation with Temperature



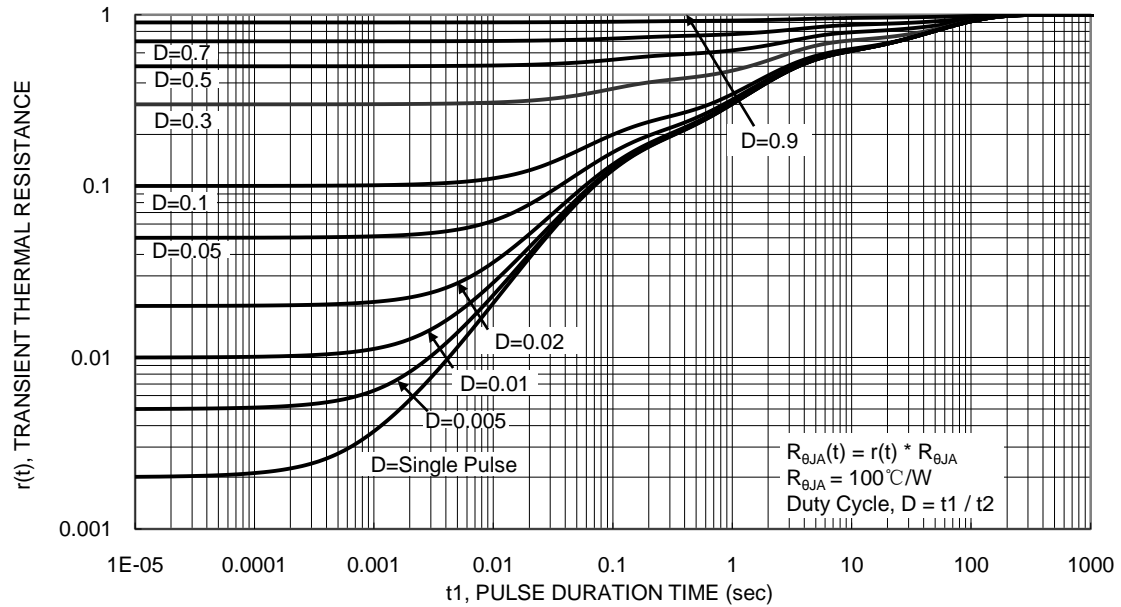
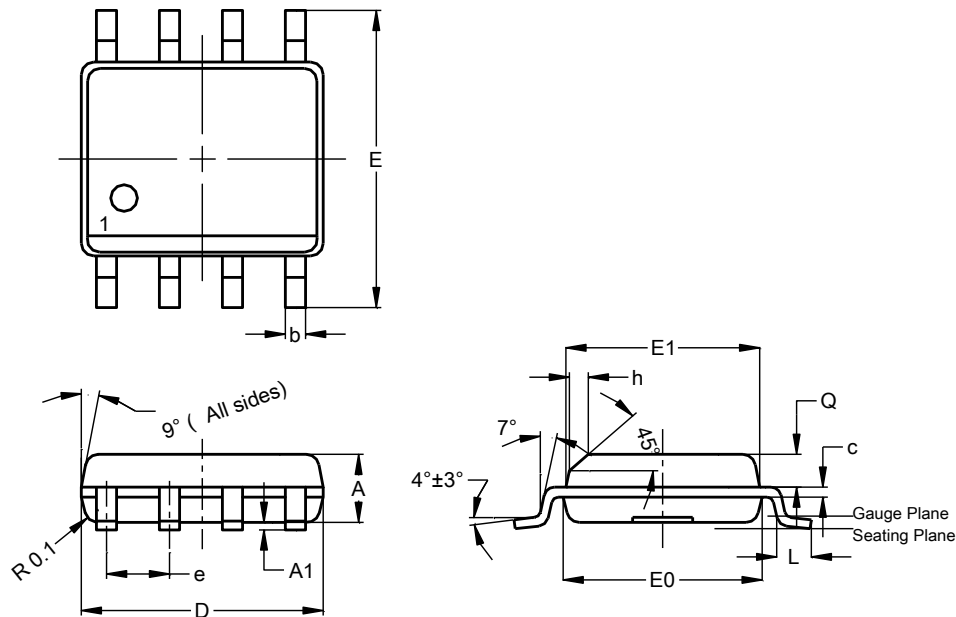


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SO-8

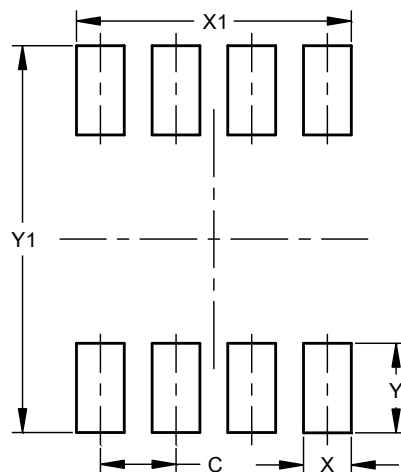


| SO-8 | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 1.40 | 1.50 | 1.45 |
| A1 | 0.10 | 0.20 | 0.15 |
| b | 0.30 | 0.50 | 0.40 |
| c | 0.15 | 0.25 | 0.20 |
| D | 4.85 | 4.95 | 4.90 |
| E | 5.90 | 6.10 | 6.00 |
| E1 | 3.80 | 3.90 | 3.85 |
| E0 | 3.85 | 3.95 | 3.90 |
| e | -- | -- | 1.27 |
| h | - | -- | 0.35 |
| L | 0.62 | 0.82 | 0.72 |
| Q | 0.60 | 0.70 | 0.65 |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SO-8



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 1.27 |
| X | 0.802 |
| X1 | 4.612 |
| Y | 1.505 |
| Y1 | 6.50 |

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